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1: Biochim Biophys Acta. 1981 Dec 7;649(2):377-84.

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Inhibition of growth of Escherichia coli by lactose and other galactosides.

Wilson DM, Putzrath RM, Wilson TH.

A study has been made of the inhibition of growth caused by the addition of lactose or other galactosides to lac constitutive Escherichia coli growing in glycerol minimal medium. The effect was greater at pH 5.9 and pH 7.9 than at pH 7.0. Inhibition of growth by lactose was observed also in the case of a beta-galactosidase negative mutant. However, a lacY mutant, which has a defect in the entry of protons normally coupled with galactoside transport, showed only slight inhibition of growth on the addition of galactosides. In the case of the parental strain the addition of lactose resulted in a sharp fall in delta pH across the cell membrane and a reduction in intracellular ATP, and the recovery was slow. Under the same conditions the lacY mutant showed a smaller and only transient effect. It is postulated that the sudden entry of protons associated with lactose uptake lowers the protonmotive force, reducing the ATP levels and inhibiting growth of the cells. This hypothesis would account also for the selection of lacY mutants found when E. coli is grown in the presence of isopropyl-beta-D-thiogalactoside.

PMID: 7032592 [PubMed - indexed for MEDLINE]

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May 22 2006 06:31:57